

Pyroelectric Quantum Well Energy Harvesters

Completed Technology Project (2013 - 2015)



Project Introduction

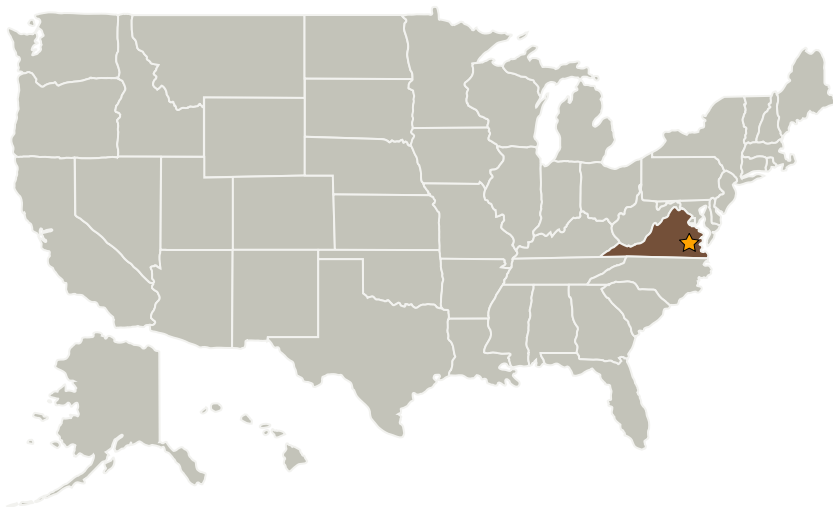
Investigation of pyroelectric energy harvesters with enhanced efficiencies through quantum wells induced by a multilayer design.

We are investigating pyroelectric energy harvesters with enhanced efficiencies through quantum wells induced by a multilayer design. Pyroelectric materials generate surface charges/voltage when heated or cooled. This type of material has been investigated for energy harvesting applications, but has thus far yielded power far below theoretically calculated outputs. The innovation here is the multilayer design that takes advantage of quantum wells induced by thin layers of materials with mismatched band gaps to enhance local polarization of confined charge particles by a potential well with discrete energy thus enhancing power generation.

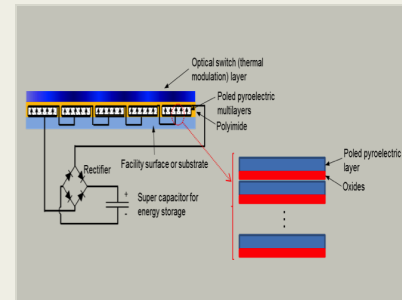
Anticipated Benefits

Takes advantage of temperature fluctuations in aerospace environments to supply power to electronic components.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Langley Research Center (LaRC)	Lead Organization	NASA Center	Hampton, Virginia



Project Image Pyroelectric Quantum Well Energy Harvesters

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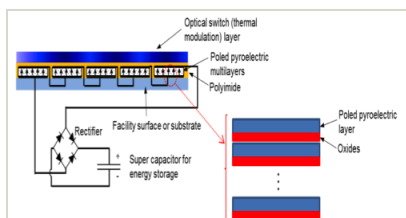
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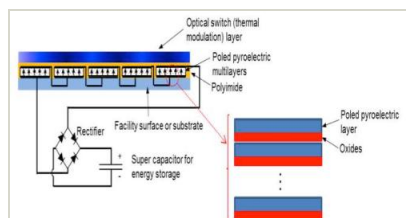
Co-Funding Partners	Type	Location
National Institute of Aerospace	Academia	Hampton, Virginia

Primary U.S. Work Locations
Virginia

Images

**12017-1378754936536.png**

Project Image Pyroelectric
Quantum Well Energy Harvesters
(<https://techport.nasa.gov/image/2274>)

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Project Image Pyroelectric
Quantum Well Energy Harvesters
(<https://techport.nasa.gov/image/2275>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Center Innovation Fund: LaRC
CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

Julie A Williams-byrd

Project Manager:

Emilie J Siochi

Principal Investigator:

Emilie J Siochi

Co-Investigators:

Glen C King

Jin Ho Kang

Tian-bing Xu

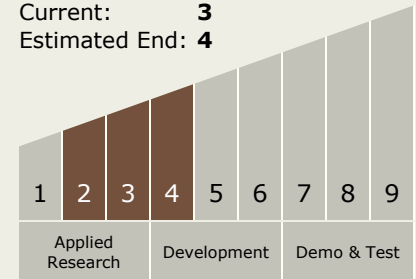
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Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **4**



Technology Areas

Primary:

- TX02 Flight Computing and Avionics
 - └ TX02.2 Avionics Systems and Subsystems
 - └ TX02.2.2 Aircraft Avionics Systems